Interview with Dr. Michael F. McGrath
Deputy Assistant Secretary of the Navy
Research, Development, Test and Evaluation

Dr. Michael McGrath is the deputy assistant Secretary of the Navy for research, development, test and evaluation. His role is to aggressively drive new technologies from all sources across Navy and Marine Corps platforms and systems, and to develop programs to bridge the gap in transitioning new capabilities from science and technology (S&T) to acquisition. CHIPS spoke with Dr. McGrath in August 2006.

Dr. Michael F. McGrath

CHIPS: Can you talk about your role as the commercial technology transition officer for the Department of the Navy?

Dr. McGrath: My official title is the DASN for RDT&E. A major function that I have is to be an advocate for technology transition. That means having one foot in the world of science and technology and the other foot in acquisition in order to move new technologies across the valley of death to a program of record. That transition is a difficult thing to achieve.

On one side is a technology source ready to launch new ideas into full scale development and production. On the other side is the acquisition community, which is risk-averse and will, only as a last resort, pull something that is immature into their system.

It is a process in which many players must agree on the criteria for handing something from S&T into an acquisition program. We have a number of ways designed to get at various aspects of that problem.

CHIPS: Do you transition programs through the Advanced Concept Technology Demonstration program?

Dr. McGrath: ACTD is one of the programs that I would consider to be in the portfolio of tools for tech transition. ACTDs are run by OSD (Office of the Secretary of Defense) and all of the services play in them. Each ACTD is managed by a lead service or agency developer and driven by the principal user sponsor. As a general rule, the user sponsor is usually a unified commander.

The ACTD is designed to deliver a prototype into the field with a transition agreement so that in a three- to five-year period, a capability is developed and fielded in response to a user need. In some cases you are co-developing the concept of operations and the need along with the technology.

Many of the ACTDs are based on advanced technologies which demand a new concept of operations, tactics and doctrine in order to realize their maximum potential.

The ACTD provides a means to develop, refine and optimize these warfighting concepts to achieve maximum utility and effectiveness.

With the ACTD team is a transition manager whose job is to transition the prototype into a program of record.

A key goal of the program is to move an ACTD into the appropriate phase of formal acquisition without loss of momentum, assuming the user makes a positive determination of military utility.

Each ACTD has a clear acquisition goal for the post-ACTD phases. Additionally, there must be provisions for the development of formal operational requirements; documents addressing interoperability, life cycle cost, manning, and training; and preparations for supportability.

CHIPS: Do you work with industry, the universities and the naval research centers to transition ACTDs?

Dr. McGrath: Yes, I transition technology from all sources. ACTDs and other programs become part of the portfolio of transition tools depending upon the source of technology. ACTDs often start with ideas that come from industry or the naval warfare centers or other government activities. The priorities are set largely by the combatant commanders.

At the back end of that process, there is a program of record, and if it is a Navy program of record, we want to have a resource sponsor and acquisition manager in on the decision to launch the ACTD. (See Figure 1, Deal Components.)

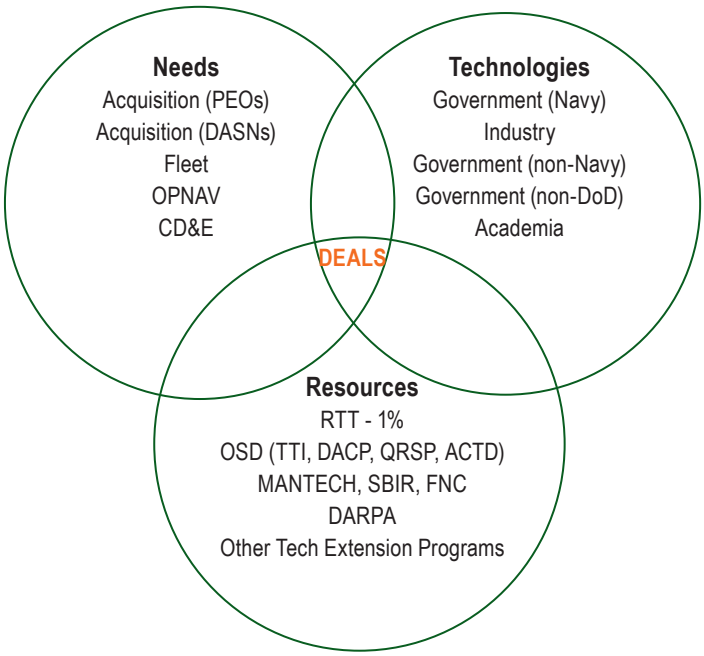
An ACTD will not be approved unless there is a commitment by a lead service or agency to accept the responsibility for preparing for transition at the end of the ACTD, and the risks are understood and accepted.

Even with the use of sufficiently mature technology, there can be technical risks associated with engineering and integration work to be performed. The more complex the capability, the greater these risks tend to be.

There can also be programmatic risks (e.g., cost and schedule), as well as operational risks related to the acceptability of the operational concepts necessary to realize the full benefit of the proposed capability.

These risks must be identified and accepted by the primary stakeholders in the ACTD prior to its initiation.

Figure 1. Deal Components.



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Dr. Michael McGrath
DASN RDT&E

CHIPS: What about advanced technologies that come from industry or the universities? How are they transitioned?

Dr. McGrath: If you are talking about other sources of technology that are commercial or university-based, then other tools come into play.

One tool is a Navy program called Rapid Technology Transition, or RTT. The RTT program provides current-year funding for emerging capabilities. The RTT program office tries to broker a deal that matches an interesting technology with a user who has a need.

A resource sponsor must agree that this will be funded as a program of record, and then usually the problem is the budget.

If Navy did not budget for the technology this year, the best we can do is to try to find funding next year or put it in the POM (Program Objective Memorandum) for funding in two years. In the intervening time the deal often unravels.

The RTT program can step in with bridge funding to keep the deal alive until the program of record money can kick in. That bridge funding is used to do testing and evaluation to flight-certify an item so it can go into an aircraft or ship.

A little bit of money can keep a deal alive until more substantial funding becomes available.

The largest Navy transition-oriented program is at the Office of Naval Research, and it is called the Future Naval Capabilities or FNCs. The FNCs have about one-third of the Navy's S&T money. This is the part of ONR's portfolio that is directly related to requirements — capability gaps defined by OPNAV (Office of the Chief of Naval Operations).

The FNCs have tech transition agreements with acquisition programs of record built-in early in the life of an FNC.

CHIPS: Do the FNCs use mature technology?

Dr. McGrath: Yes. We measure technology maturity with technology readiness levels (TRL). Typically, an FNC would start with TRL 5 and an FNC would transition at TRL 6 or maybe TRL 7. (See Figure 2, Technology Readiness Levels below.)

CHIPS: Is there an average time span between when technology would move up between levels?

Dr. McGrath: FNCs are designed to take three to five years to deliver, similar to ACTDs. Information technology tends to mature more rapidly than, for example, a new structural material. You can do spiral development of information systems and allow the user to experiment with the system.

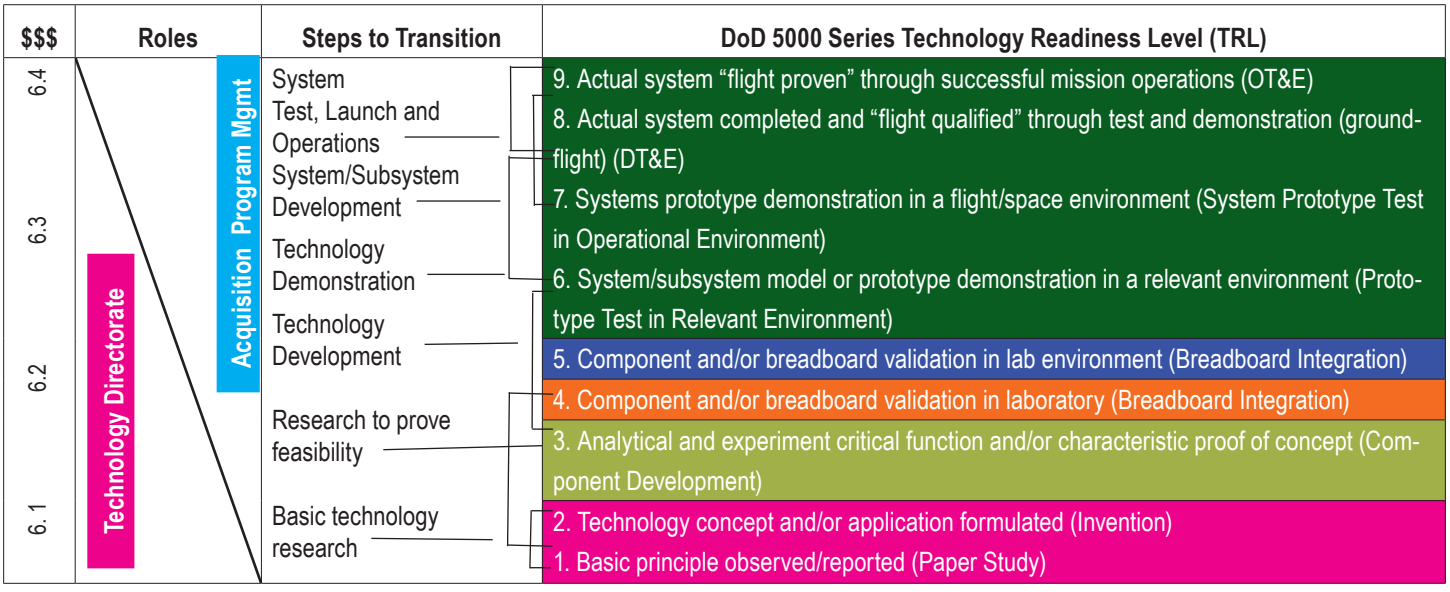
The TRL levels have to do with the scale at which you have done demonstrations and the environment in which you are doing those tests and demonstrations.

Often in information systems we can get a representative environment in a spiral development fashion and expand to a reasonable scale of operations so that the user has confidence that this is at a maturity level that will not add undue risk to the acquisition program.

We manage FNCs with IPTs, an integrated process team structure, which brings together the requirements community (that is the fleet), the resource sponsor from OPNAV, the acquisition community, and the science and technology community. The current portfolio of FNC projects is managed by five IPTs, each led by a member of the Senior Executive Service or flag officer.

That means that we are developing new FNCs and overseeing the execution of the ongoing FNCs with teams that have all the

Figure 2. Technology Readiness Levels (TRL).



Deal Name	PEO	Operational Impact
Virginia-Class Multi-Level Security (MLS)	PEO(Subs)/PMS-401/PMS-450	Integrates commercial security software and provides onboard MLS for data routing, network transmissions, and information storage avoiding burdensome procedural security measures and costly redesign efforts for the onboard network on the Virginia-class attack submarines and USS Los Angeles SSN 688 backfit; an estimated $76.8 million in integration and redesign cost can be avoided.
Commercial Emulator for E-2C Hawkeye Mission Computer	PEO(T)/PMA-231	Solves obsolescence problems in the E-2C Hawkeye by introducing a form, fit and function emulation technology combined with commercial-off-the-shelf (COTS) technology. Provides for the expansion of capabilities in response to new fleet requirements.
USMC Universal Communications Interface Module (UCIM)	MARCORSYSCOM	Allows integration of legacy radios and future Joint Tactical Radio System (JTRS) sets with C2 systems and antenna arrangements in a common environment across multiple platforms. The UCIM will decrease C2 platform costs, improve C2 platform capabilities, and provide tractable transition path from legacy radios to JTRS.
C2 On-The-Move Network Digital Over-the-Horizon Relay (CONDOR)	MARCORSYSCOM	Provides for a 12-month acceleration of the Ku-band capability for the Command and Control CONDOR program. The solution consists of a COTS-based Ku satellite communications system integrated into the CONDOR gateway and Jump Command and Control Vehicle (JC2-V). The current solution is the International Maritime Satellite (Inmarsat) system which costs $11 per minute and provides for 65 kbps. The Ku systems are expected to cost $1 per minute and provide 256 kbps.

Figure 3. Transitioned FORCEnet Capabilities.

players necessary for success of the project and for successful transition at the end.

We have brought together the stakeholders from the outset of the S&T project to make sure we have built a bridge across the valley of death instead of having a scientist or engineer invent something and try to throw it over the wall to somebody who is going to receive it in the acquisition community.

I want to make sure we give plenty of credit to OPNAV, the fleet and the acquisition community, in addition to ONR, for all being stakeholders in that FNC process.

CHIPS: When you refer to the acquisition community, are you talking about the program executive offices?

Dr. McGrath: Yes, we have PEOs on each of the five FNC IPTs. Four of the IPTs are aligned with the Sea Power 21 pillars, which are Sea Strike, Sea Shield, FORCEnet and Sea Basing.

There is a fifth IPT called Enterprise and Platform Enablers. This is where you would find corrosion control technologies that would have life cycle savings that would not fit into the warfighting pillars.

Those IPTs have PEOs on them who represent the acquisition community. They have senior representation from the fleet or from the Marine Corps, and they have resource sponsor representation from both OPNAV and Marine Corps. They also have S&T representation from ONR.

There is an oversight group called the Technology Oversight Group (TOG), co-chaired at the three-star level by OPNAV N8 (resources, requirements and assessments) and the Marine Corps Combat Development Command.

The TOG brings all stakeholders together. They approve FNC new starts, they review transition progress, and they intervene and fix things if transitions start to get off track.

This group is working problems that are important to the whole naval enterprise.

CHIPS: Have any FORCEnet-type technologies transitioned to the acquisition community?

Dr. McGrath: A lot of the systems that I am transitioning are FORCEnet-related systems. Earlier you mentioned the commercial technology transition office. That has been renamed. It is now called the Rapid Technology Transition office, or RTT office, that I talked about earlier. It is located at ONR.

The RTT office has done a number of transitions into systems that provide situational awareness or enhanced networking capabilities. One example is a multilevel secure coalition architecture transitioned to PEO C4I (command, control, communications, computers and intelligence).

The solution transitioned by RTT provides accredited multilevel secure (MLS) servers, chat services and information sharing in a single enclave, rather than a highly segmented solution for each coalition partner.

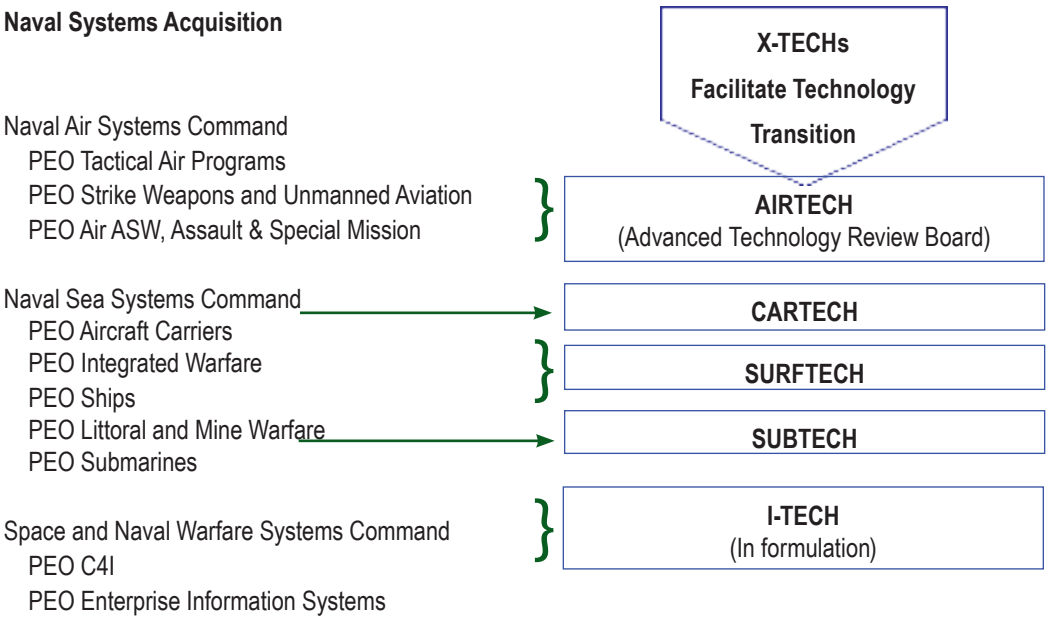
This advance in sharing critical information with allies and coalition partners supports collaboration that is critical to joint and coalition operations. There are other RTT examples that have transitioned FORCEnet enablers to aviation platforms, submarines and Marine Corps systems. (See Figure 3, Transitioned FORCEnet Capabilities.)

CHIPS: Do you look globally for new technologies?

Dr. McGrath: Each of these programs in the transition portfolio, ACTDs, FNCs and RTTs has its own mechanisms for inviting new project proposals.

CHIPS: So your office does not investigate new technologies?

Dr. McGrath: The RTT office does try to stay aware of new technologies. Sometimes it encourages programs to respond. They get help from groups in the systems commands that we refer to



Each of these programs in the transition portfolio — Advanced Concept Technology Demonstration, Future Naval Capabilities and Rapid Technology Transfer — has its own mechanisms for inviting new project proposals.

Each of the X-TECHs constantly reviews science and technology innovations and looks for insertion opportunities into Navy programs of record and acquisition programs.

The acquisition and S&T communities work closely together to identify technology approaches and solutions.

Figure 4. The X-TECHs work closely with the S&T community and the DASN RDT&E looking for innovative solutions to rapidly respond to warfighter needs.

as the 'X-TECHs.' Each domain has an organization that works to identify the technologies desired and to either find a commercial solution or have a solution developed.

There is a group at Naval Air Systems Command for aircraft called AIRTECH. For ships there is SURFTECH. At Naval Sea Systems Command, there is SUBTECH for submarine technology.

There is a group being formed at the Space and Naval Warfare Systems Command (with a lot of input from OPNAV N6) called I-TECH which works on FORCEnet.

There are also carrier technologies called CARTECH. (See Figure 4, X-TECHs.)

Each of these X-TECH groups is constantly reviewing technology and looking for insertion opportunities. They are involved in responding to these programs — the ACTDs, FNCs and the RTTs.

CHIPS: The groups that you just mentioned would stay abreast of emerging technologies to prevent technological surprises being used against the Navy and, ultimately, the United States?

Dr. McGrath: There are different levels for that. The groups I mentioned, the X-TECHs, are looking for mature technologies that are candidates for transition. The ONR, the Navy, and the broader S&T community try to stay plugged into scientific developments around the world.

ONR has an office called ONR Global with several international locations and a staff that tries to stay plugged into emerging scientific developments. They attend conferences and visit universities and industry on an international basis to stay aware of new developments and prevent technological surprise.

A lot of the work that goes on in government laboratories and our university-affiliated research centers involves taking scientific discoveries and turning them into technologies and applications that have military importance. They are making sure that we are not surprised by somebody developing a military application from a scientific breakthrough.

CHIPS: Are you excited about any new technologies that you think might have military application?

Dr. McGrath: One of the great things about this job is the opportunity to look across the broad horizon of technology and see something new every month. At the basic research level, you hear a lot about new fields like nanotechnology, where there are breakthroughs seemingly on a monthly basis. It is the job of our S&T community to see the possibilities for naval relevance of those things.

Nanotechnology can lead to advanced coatings that will give us better corrosion resistance in the maritime environment, better wear characteristics, or lightweight armor and power systems for dismounted Marines.

At the system level, advances in power control, power electronics, power systems and power storage make it possible for us to build systems like the electromagnetic launch system for CVN 21, the future aircraft carrier replacement program, or the electromagnetic railgun that is in development at ONR.

I would have to say the most exciting technologies for me are the ones that are saving lives on the battlefield and helping our warfighters accomplish their missions in harsh real-world conditions.

Often these warfighter solutions trace their roots to S&T programs started 20 years earlier. Your readers can find lots of examples of new technologies at the ONR Web site at http://www.onr.navy.mil, that are making a difference for today's Navy, tomorrow's Navy — and the Navy after next.

For more information about the work of the deputy assistant Secretary of the Navy for research, development, test and evaluaton and to view Dr. McGrath's biography, go to http://acquisition.navy.mil/organizations/dasns/dasn_rdt_e.

For information about the electromagnetic railgun, the next generation of naval gun, go to page 40.

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